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10/815,108

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Rakesh Tuli

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10/04/2006

Ladas & Parry
26 West 61 Street
New York, NY 10023

EXAMINER

HWU, JUNE

ART UNIT

PAPER NUMBER

1661

DATE MAILED: 10/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/815,108

Applicant(s)

TULI ET AL.

Examiner

June Hwu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 9/30/04

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____

DETAILED ACTION

Claim Objections

1. Claims 3, 6 and 23 are objected to because of the following informalities:

Claim 3, at step v, is missing a conjunction after "days".

Claim 6 at part b, the recitation "183" appears to be a typographic error because in Table 2 (page 13, line 18) it states "0.83".

Claim 23, recitation of "812" appears to be a typographic error because on page 21, line 16 of specification it states "8-12 days".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Dependent claims are included in all rejections.

Claim 1 at part (v), the recitation "sufficient period of time" is unclear. A "sufficient period of time" for what?

Claim 6 at part a, is unclear in its recitation of "Murashige and Skoog (1962)" because Applicants are citing the article. It is suggested that the year be deleted.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art

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are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 2, 6-8, 10-18, and 19-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mishra et al (Plant Cell, Tissue and Organ Culture 73:21-35, 2003) in view of Trolinder et al (Plant Cell, Tissue and Organ Culture 12, 43-53, 1988).

The claims are drawn to a method for regeneration of cotton by somatic embryogenesis by culturing the explant from cotton 'Coker 312' seed in medium containing glucose, Murashige and Skoog medium, Gamborg B5 vitamins, 2,4-D, BA, agar, and inositol at a specific temperature and light condition for about 3-5 weeks to form callus, then transferring the callus to liquid induction medium containing glucose, Gamborg B5 vitamins deprived of inositol at a specific temperature and light condition to form embryogenic clumps, then transferring somatic embryo to a germination medium and growing into a plant.

Mishra et al teach a method for regeneration of cotton through somatic embryogenesis comprising cutting the cotton 'Coker 312' hypocotyl from the seedling, then culturing the explant in a callus induction solid medium containing MS (Murashige and Skoog) salts supplemented with 100 mg l⁻¹ myo-inositol, B5 vitamins (10 mg l⁻¹ thiamine-HCl; 1 mg l⁻¹ nicotinic acid; 1 mg l⁻¹ pyridoxine), 0.75 g l⁻¹ MgCl₂, 30 g l⁻¹ glucose, 0.05 mg l⁻¹ 2,4-D, 2.0 mg l⁻¹ NAA adjusted at pH 5.8 before adding 2.5 g l⁻¹ Phytigel at a temperature of 28±2°C under cool white and full spectrum fluorescent lights with a 16 hour photoperiod for 3 to 4 weeks (pp. 23-24). For regeneration of the cotton, 0.5g of callus per 15-ml of medium were transferred to liquid medium

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containing MS salts, 100 mg l^{-1} myo-inositol, B-5 vitamins, 0.75 g l^{-1} $MgCl_2$, 30 g l^{-1} glucose, 1.9 g l^{-1} KNO_3 and adjusted to pH 5.8, and then incubated on a rotary shaker at 120 rpm under indirect lighting at $28 \pm 2^\circ C$ (p. 24, right col.). The somatic embryos at different levels of growth were cultured on SGA (Stewart's germination medium (p. 22, right col., last paragraph) media (p. 26, left col. 1st full paragraph). When the plantlets developed leaves and roots they were potted with Pro-mix (p. 26, left col. 2nd paragraph).

Mishra et al do not teach that the embryogenic mass/clumps were deprived of inositol for a sufficient period of time before returning the embryogenic clumps to inositol containing medium for further development, and supporting the embryo in germination medium containing vermiculite, and growing the plants in potting mix of sand, peat moss, and vermiculite.

Trolinder et al teach that hypocotyl tissue of 'Coker 312' was cultured on MS medium (p. 44, 2nd paragraph). Then about 15 g of callus was placed in a flask and rotated at 110 rpm under a 16-hr photoperiod and $90 \mu Em^{-2}s^{-1}$ (cool white and full spectrum fluorescent lamps at $28 \pm 2^\circ C$ (p. 44, 2nd paragraph). The embryogenic cells were then washed three times in which a sufficient period of time the inositol was lacking (p. 45, 1st paragraph). Then the embryos were placed in 25 x 100 mm culture tube filled with vermiculite with germination medium (p. 47, 1st full paragraph). The plants were grown in a potting mixture containing peat and sand (p. 48, 2nd full paragraph).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the method of cotton regeneration through somatic embryogenesis as taught by Mishra and combine that method by depriving the somatic embryos of inositol for a sufficient period of time and growing them into plants as taught by Trolinder. One of ordinary skill in the art would have been motivated to do so given that Trolinder subculture the embryos without inositol for a "sufficient period of time" and the embryos were able to develop into plants. With

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regard to the embryogenic mass/clumps deprived of inositol for a period of 8-12 days would clearly be a result of effective parameter that a person of ordinary skill in the art would routinely optimize. Optimization of parameters is a routine practice that would be obvious for a person of ordinary skill in the art to employ. It would have been customary for an artisan of ordinary skill to determine the optimal amount of embryogenic mass/clumps in order to best achieve the desired results because 8-12 days is within the 30 days as cited by Trolinder. With regard to the potting mix, it would be an optimization of parameters to find the best soil mix for the cotton plants as shown by Trolinder. Furthermore, one of ordinary skill in the art would have a reasonable expectation of success in the combination of Mishra and Trolinder because the absence of inositol for a "sufficient period of time", vermiculite as a support medium, and using a mixture of potting mix would be a choice of experimental design and is considered within the purview of the cited prior art. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

4. Claims 3-5, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mishra et al in view of Trolinder et al as applied to claims 1, 2, 6-8, 10-18 and 19-25 above, and further in view of Gupta et al (Plant Cell, Tissue and Organ Culture 51: 149-152, 1997).

The claims are drawn to cotton 'Coker 312' seedling sterilized with HgCl_2 for 5-10 minutes, then scorching the seed in flame of a spirit burner for 5-10 seconds and growing the seed in seed germination medium in light or dark at specific temperature for 6-12 days and excising the explant from the seedling and in the callus induction medium the cytokinin is BA (6-Benzyladenine).

The teachings of Mishra et al in view of Trolinder et al are discussed above.

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Mishra et al in view of Trolinder et al do not teach the flaming of the seed and the use of BA in the induction medium.

Gupta et al teach a method of cotton regeneration comprising the cotton seeds are surface disinfected by agitation for 7 minutes in 0.1% (w/v) HgCl_2 and then rinsing three times with sterile distilled water followed by dipping in 90% ethanol and flaming (p. 149, left col. last paragraph). The seeds were germinated on half strength of MS medium containing sucrose, 0.8% (w/v) agar and adjusted to a pH of 5.8 before autoclaving (p. 149, right col.). The cultures were incubated at $25 \pm 2^\circ\text{C}$ with a 16 hour photoperiod by cool light fluorescent ($90 \mu\text{mol m}^{-2}\text{s}^{-1}$ PAR) (p. 149, right col.). Then the explants of shoot apex along with cotyledon node of hypocotyls without cotyledon, with both cotyledons attached and single cotyledon attached were cultured on modified MS medium with myo-inositol, glucose and 2.2 to $44.4 \mu\text{M}$ BA (p. 149, right col. - p. 150, left col.).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the method of cotton regeneration through somatic embryogenesis as taught by Mishra and Trolinder and combine the method of flaming the seed and using BA in the medium as taught by Gupta. One of ordinary skill in the art would have been motivated to do so given that flaming the seed is a form of scarification to break dormancy. With regard to the BA in the medium, Gupta showed that BA was effective in inducing growth (abstract and Table 1). Furthermore, one of ordinary skill in the art would have a reasonable expectation of success in the combination of Mishra, Trolinder and Gupta because flaming the seed and supplementing the medium with BA would be a choice of experimental design and is considered within the purview of the cited prior art. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

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Conclusion

No claims are allowed.

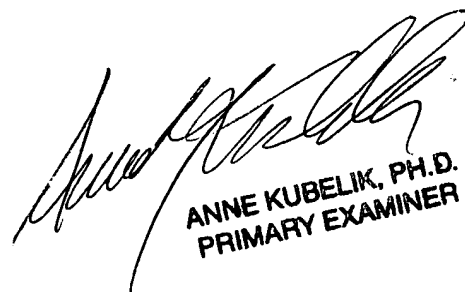
Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to June Hwu whose telephone number is (571) 272-0977. The Examiner can normally be reached Monday through Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Anne Marie Grunberg, can be reached on (571) 272-0975. The fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JH



ANNE KUBELIK, PH.D.
PRIMARY EXAMINER